NITGEN® EvTools

Evaluation Program for Stand-Alone Fingerprint Recognition Device

User Manual

(For FDA12, FIM10, and FIM01)

Version 1.05

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Serial Number:

Specifications can be changed without notice.

Revision History

Date	Version	Description
June , 2003	0.9	Preliminary version
January 16, 2004	0.91	Functions of FIM10 are added
January 26, 2004	0.92	Minor misprint fixed
February 3, 2004	0.93	Minor misprint fixed
February 11, 2004	1.0	Release
June 28, 2004	1.05	Functions of FIM01 are added

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System environment

System requirements

- Windows 98, Windows NT, Windows 2000, Windows XP

Target Device

- FDA12
- FIM10 – HV, FIM10 – LV
- FIM01

Communication

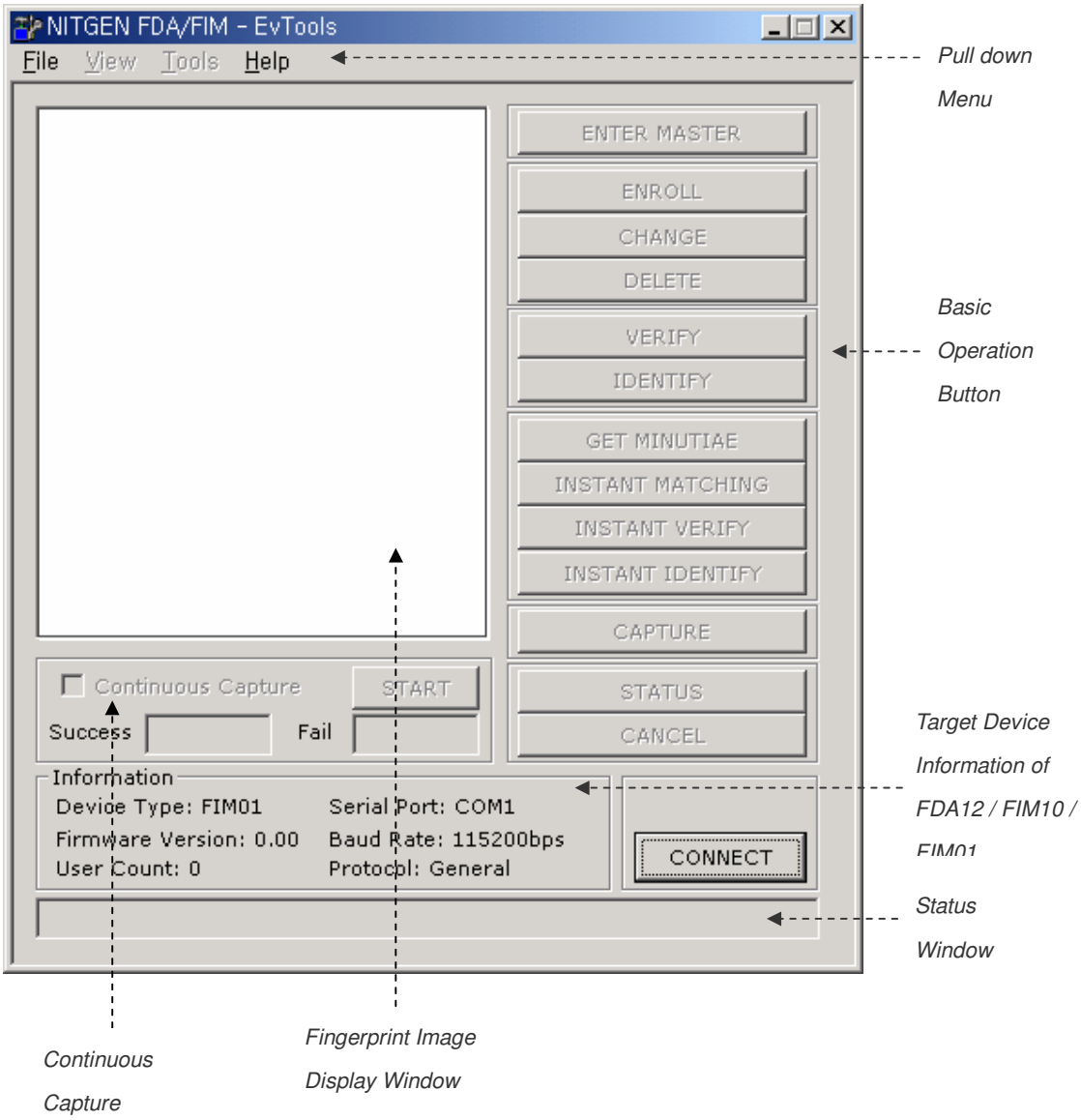
- COM port

The specification of serial cable

Target Board	Type of Cable
FDA12	9 pin (F) / 9 pin (M) direct type
FIM10	9 pin (F) / 9 pin (F) cross type
FIM01	9 pin (F) / 9 pin (F) cross type

1. How to Connect

1.1 About the Evaluation Program



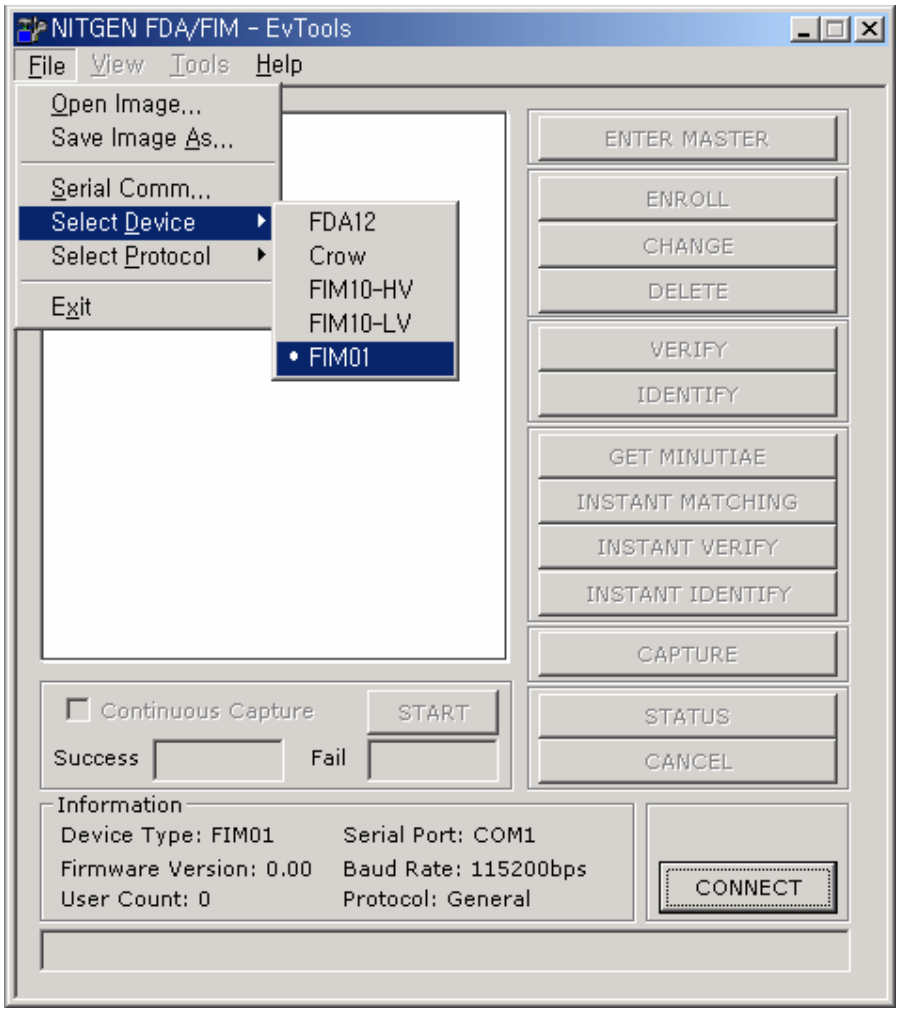
[Figure 1] Main window of the Evaluation Program

The evaluation program, "EvTools™" which is shown above, is mainly designed to test and evaluate functions of FDA12, FIM10 and FIM01. The initial display is composed of an image window for fingerprint (FP) display, information box for system information and a few buttons for

a specific function. And it is possible to set/get hardware configuration like baud rate of serial communication (RS232) and manage FP database (DB) in the EvTools™.

1.2 Initial Connection

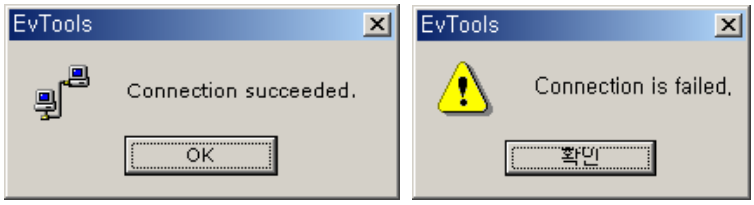
After executing “FIM_EvTools.exe”, you can communicate with the target device.



[Figure 2] The selection of target device

For connection, you should select target device type by selecting ‘**File->Select Board -> FDA12 / FIM10 / FIM01**’ after checking a serial cable and power line are correctly connected. And then click ‘CONNECT’ button. If the connection is successfully made, a success message shown in

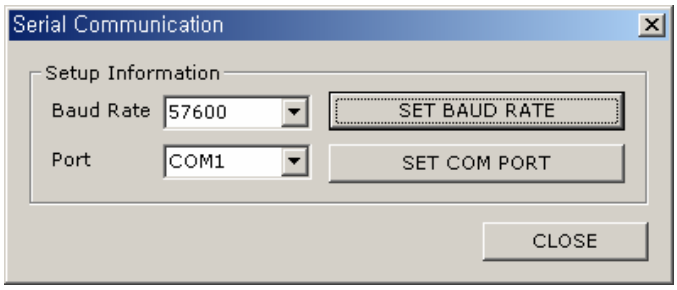
[Figure 3] pops up. Otherwise a failure message pops up. The Initial baud of serial communication is set to 9,600 bps by default.



[Figure 3] The messages window for establishing the connection of serial communication

1.3 Serial Communication Set-Up

In the EvTools™, you can change baud rate you want. Firstly, select '**File->Serial Comm**' to display the configuration window shown in [Figure 4]. Then change baud rate to the new value and click '**SET BAUD RATE**' button. The default baud rate of device is 9,600 bps.



[Figure 4] Serial communication configuration window

If all procedures are successfully done, the message window shown in [Figure 5] is displayed.

[Figure 5] Success message window for changing baud rate

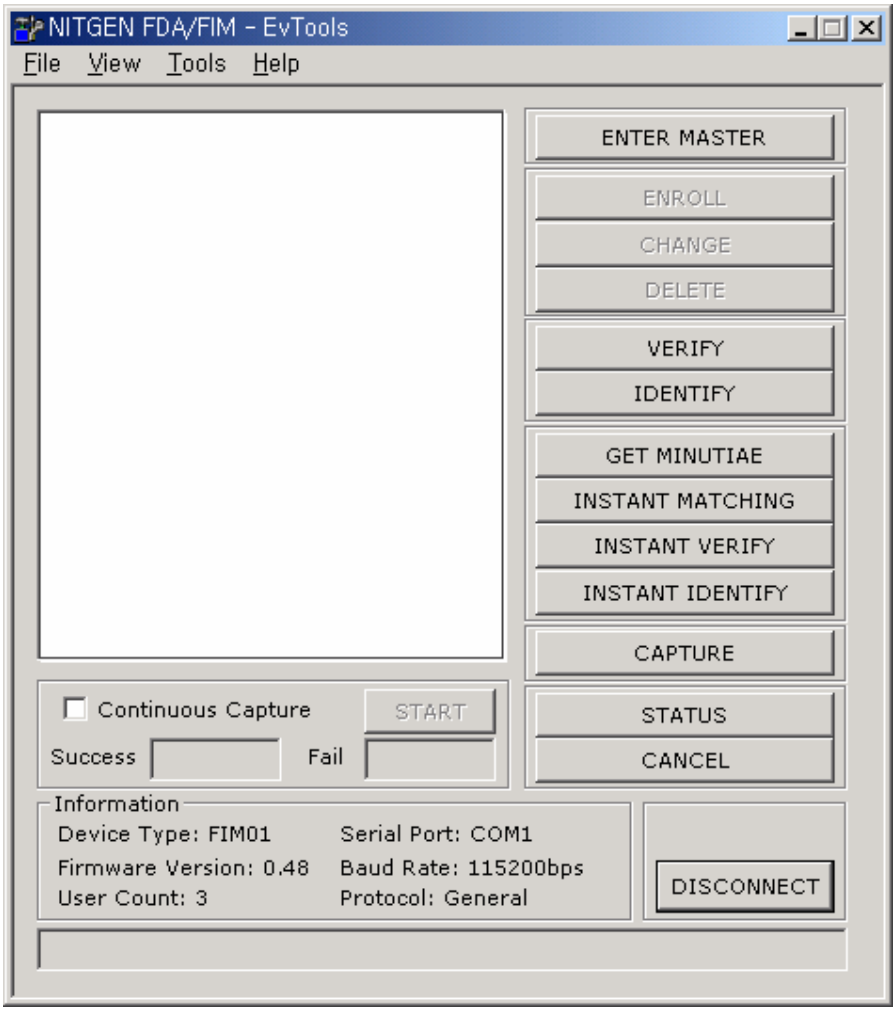
For a communication with a new baud rate, try to connect again by clicking the 'CONNECT' button.

In FDA12 and FIM10, both device and EvTools™ 's baud rate are changed by this function. But

in FIM01, Only EvTools™'s baud rate is changed. The baud rate of FIM01 can be changed in the system configuration window. Refer to Appendix A.

2. Operation of Basic Functions

2.1 Master Mode



[Figure 6] Main window after connection

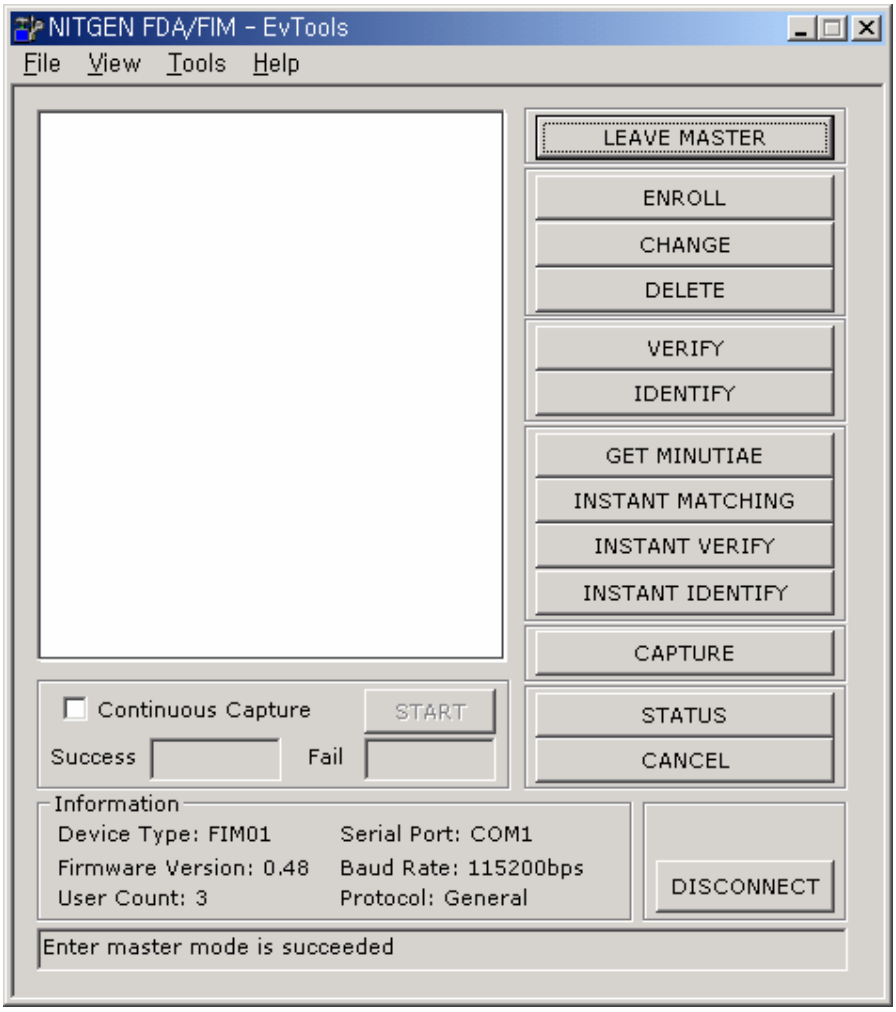
The Main window configuration is different between device types.

After connecting, most of all buttons get activated as shown in [Figure 6]. But several buttons like 'ENROLL' still are not enabled by the reason that these functions should be done by masters.

The device doesn't have any registered user initially. So, first of all, you should register the first master FP after changing to master mode by clicking the 'ENTER MASTER MODE' button.

In the master mode, it is possible to add/delete user, convert user privilege (normal/master) and create/delete password for user and device. In FIM01, it is possible to change user FP and password, too.

If masters or device password were registered in device, the device asks master authentication with FP, password or device password to change into master mode. It will be explained later at section 3.2.4 and 3.5.

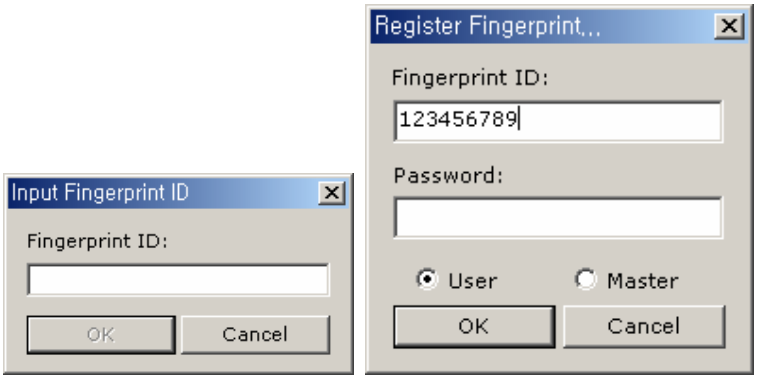


[Figure 7] Main window in master mode

2.2 Enrollment

This paragraph explains the procedure of enrolling a new user. After clicking the 'ENROLL' button in master mode, the request window for FP ID and password shown in [Figure 8] is

displayed for each device.



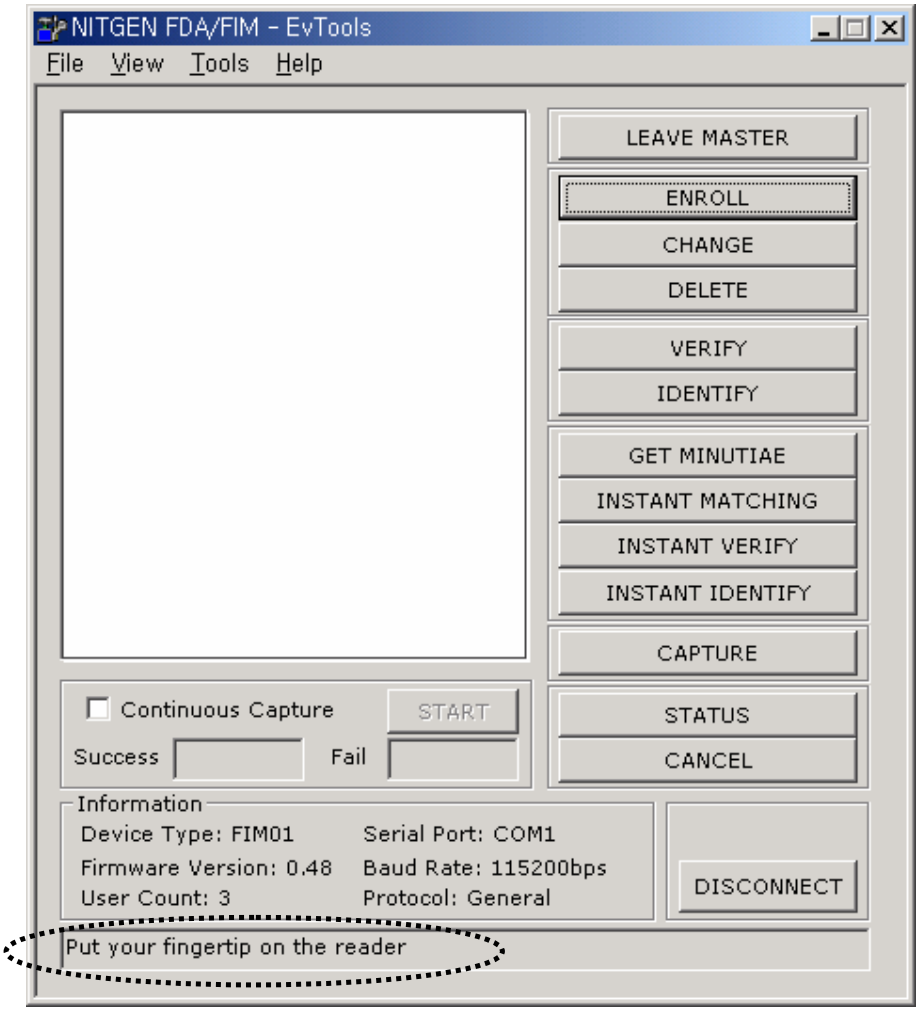
FDA12 **FIM10 & FIM01**

[Figure 8] Request window for fingerprint ID and password

The FP ID is possible up to 9 digits in FDA12 and FIM10, and is possible up to 10 digits in FIM01. Optionally the password is possible up to 15 digits and the selection of master privilege is possible in FIM10 and FIM01.

[Figure 9] Warning message window for existence of the same ID

The new ID should be unique and different from all enrolled IDs. If the same ID exists, warning message window shown in [Figure 9] is displayed and the enrollment procedure gets terminated. If new ID is enrolled successfully, success message is displayed as shown in [Figure 10] and then goes to the next step.

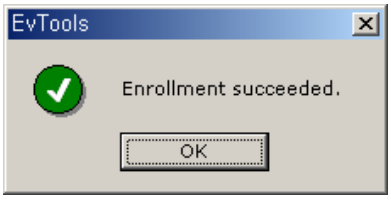


[Figure 10] Message for FP registration

After the first FP registration is done successfully, the below message window, [Figure 11], shows up. At this moment, take your finger off sensor and then put the same finger on the sensor again for the second FP registration.

[Figure 11] Message window for the success of the first FP registration

If the second FP is identical to the first FP, enrollment procedure is done successfully and the message window, [Figure 12], shows up. However, if the enrollment is failed, the message window, [Figure 13], shows up.



[Figure 12] Success message window of enrollment

[Figure 13] Failure message window of enrollment

2.3 Deletion

This paragraph explains the procedure of deleting a user record.

After clicking the 'DELETE' button in master mode, the window what requests fingerprint ID shows up. Type ID to be deleted and then clicks 'OK'. After the procedure of deletion is done successfully, the message window, [Figure 14], shows up. On the other hand, if there exists the same ID, the message window such as 'Invalid ID' shows up.

[Figure 14] Success message for deletion

2.4 Change

This paragraph explains the procedure of changing user record.

After clicking the 'CHANGE' button in master mode, the window to select change mode shown

in [Figure 15] is displayed.

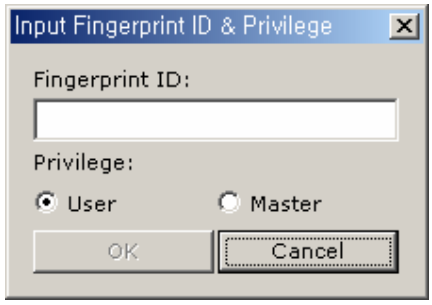
[Figure 15] The window to select change mode

** User record structure refers to developer's guide.*

** This function is only supported in FIM01*

2.4.1. Change Master Privilege & Save

After selecting the 'Change Master Privilege & Save' and clicking the 'OK' button, the request window for FP ID and privilege shown in [Figure 16] is displayed. Type ID to be changed privilege and a new privilege, and then click the 'OK' button.



[Figure 16] Request window for FP ID and privilege

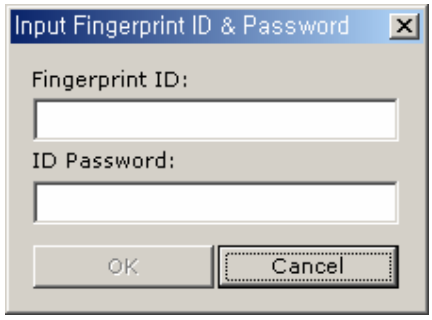
The new privilege should be different from enrolled privilege. If the new privilege is the same as old it, warning message window shown in [Figure 18] is displayed and the change procedure gets terminated. If the privilege is changed successfully, message window shown in [Figure 17] pops up.

[Figure 17] Success message window for changing privilege

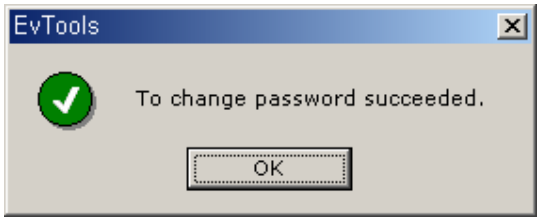
[Figure 18] Warning message window for wrong ID

2.4.2. Change Password & Save

After selecting the 'Change Password & Save' and clicking the 'OK' button, the request window for FP ID and password shown in [Figure 19] is displayed. Type ID to be changed password and a new password, and then click the 'OK' button. If the password is changed successfully, message window shown in [Figure 20] pops up.



[Figure 19] Request window for fingerprint ID and password



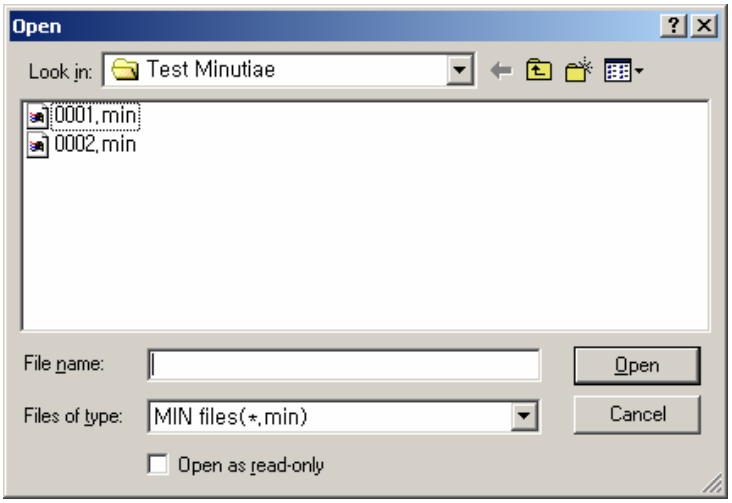
[Figure 20] Success message window for changing password

2.4.3. Change Minutiae from Host

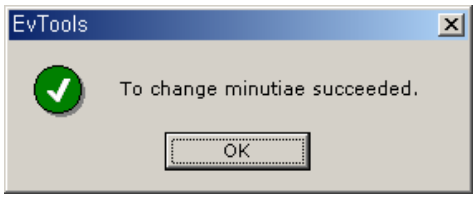
After selecting the 'Change Minutiae from Host' and clicking the 'OK' button, the request window for FP ID shown in [Figure 19] is displayed. Type ID to be changed minutiae, and click the 'OK' button, and then dialog window for opening minutiae file pops up like the following [Figure 21]. First of all, you should choose minutiae file yon want to change, and the dialog window pops up again, and then you choose other minutiae file that was extracted from same FP.

If both first minutiae and second minutiae are extracted from same fingerprint, success

message window shown in [Figure 21] is displayed. If both first minutiae and second minutiae are extracted from other fingerprint or first minutiae and second minutiae are identical, warning message box shown in [Figure 13] is displayed.



[Figure 21] Dialog window for opening fingerprint minutiae file



[Figure 22] Success message window for changing fingerprint minutiae

2.4.4. Change Minutiae from Sensor

After selecting the 'Change Minutiae from Sensor' and clicking the 'OK' button, the request window for FP ID shown in [Figure 8] is displayed. Next procedure is the same as enrollment in FDA12.

2.5 1:1 Matching (Verification)

This paragraph explains the procedure of verification using FP ID.

The 'VERIFY' button is used to compare minutiae extracted from the captured FP with enrolled minutiae that have the same ID. After clicking the 'VERIFY' button, the request window for FP ID

pops up. Types ID to be matched and then place finger on the sensor.

If the 1:1 matching, called 'Verification', is done successfully, the success message window, [Figure 23], pops up. Otherwise the failure message window, [Figure 24], pops up.

[Figure 23] Success message for the 1:1 matching

[Figure 24] Failure message for the 1:1 matching

If the wrong ID is incidentally entered, click the 'CANCEL' button to terminate the procedure of verification. In this case, the cancel message window, [Figure 25], pops up.

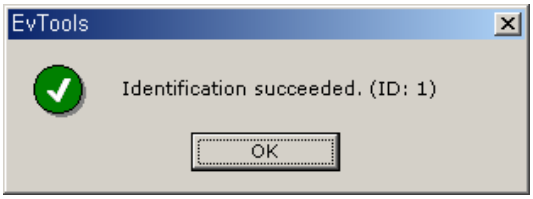
[Figure 25] Cancel message for the 1:1 matching

2.6 1:N Matching (Identification)

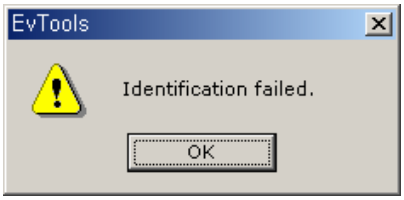
This paragraph explains the procedure of identification without using FP ID.

The 'IDENTIFY' button is used to compare minutiae extracted from the captured FP with all FP minutiae in DB of the device. After clicking the 'IDENTIFY' button, place finger on the sensor.

If the identical FP is founded through the 1:N matching, called 'Identification', the success message window, [Figure 26], pops up. On the other hand, if the identical FP is not founded, the failure message window, [Figure 27], pops up.

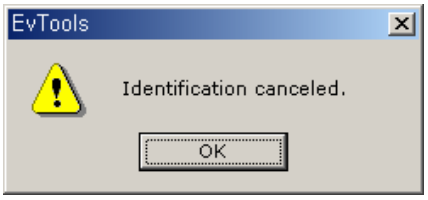


[Figure 26] Success message for the 1:N matching



[**Figure 27]** Failure message for the 1:N matching

Also, identification procedure can be canceled by clicking the 'CANCEL' button, and then the cancel message window, [Figure 28], pops up.



[Figure 28] Failure message for 1:N recognition

2.7 Instant Matching

The Instant Matching is used to compare the minutiae stored outside the device with minutiae extracted from the captured FP.

After clicking the 'INSTANT MATCHING' button, dialog window for opening minutiae file as shown in [Figure 21] pops up. Choose minutiae file you want to match, then place finger on the sensor.

2.8 Instant Verify

The Instant Verify is used to compare the minutiae stored outside the device with the minutiae stored inside the device.

After clicking the 'INSTANT VERIFY' button, request window for FP ID is displayed, and then type ID to be compared. Subsequently dialog window for opening minutiae file pops up, and then you choose it. Next procedure is same as verification.

* *This function is only supported in FIM01*

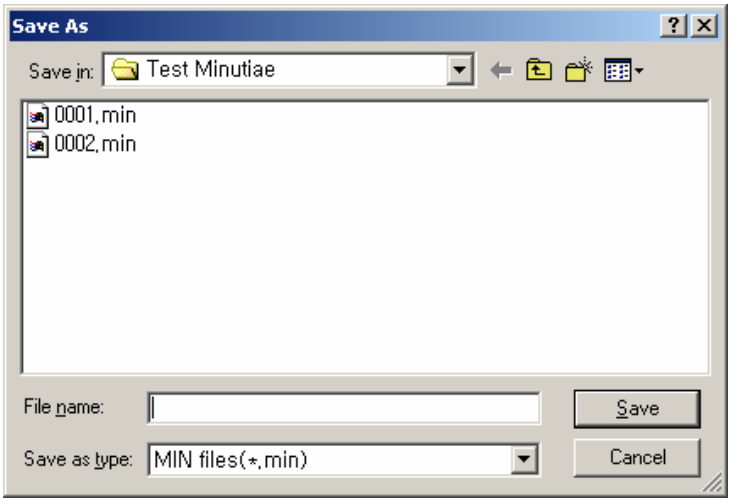
2.9 Instant Identify

The Instant Identify is used to compare the minutiae stored outside the device with the minutiae in DB of the device.
After clicking the 'INSTANT IDENTIFY' button, dialog window for opening minutiae file pops up, and then you choose it. Next procedure is same as identification.

* *This function is only supported in FIM01*

2.10 Get Minutiae

The Get Minutiae is used to save minutiae data as a file from the captured FP.
After clicking the 'GET MINUTIAE' button, place finger on the sensor. The dialog window for saving minutiae as a file, [Figure 29], pops up. Type the name of the minutiae file to save.
This function is available at the FDA12 firmware V1.1 or later, FIM10 series, and FIM01.



[Figure 29] Dialog window for saving minutiae as a file

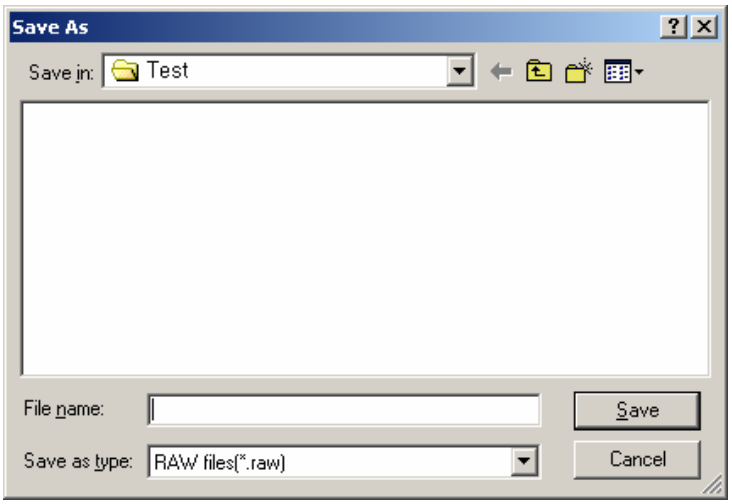
2.11 Fingerprint Capture

2.11.1. Capture

The image captured through the sensor can be seen by this function. After clicking the 'CAPTURE' button, place FP on the sensor.

The captured FP is displayed at FP image display window inside main window. If you want to save captured FP, select **'File->Save Image As**'. Then the dialog window, [Figure 30], pops up. Type the name of the image file to save. EvTools™ currently supports only raw image data.

The stored FP image can be seen again at FP image display window by selecting '**File->Open Image**'.



[Figure 30] Dialog window for saving FP image as a file

2.11.2. Continuous Capture

This function is used to continuously capture FP through the sensor and display it. After checking the 'Continuous Capture' box and clicking the 'START' button, place FP on the sensor. The following [Figure 31] shows the main window doing continuous capture.

[Figure 31] Continuous capture

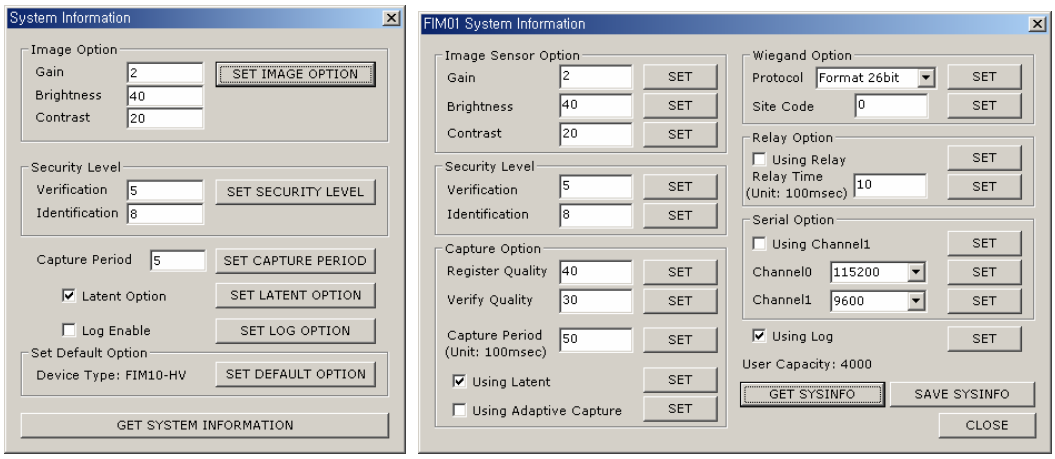
During continuous capture, 'Success' value indicates how many images are captured successfully. And 'Fail' indicates how many errors occur.

Click the 'STOP' button to stop capture.

3. Operation of Additional Functions

3.1 System Configuration

You can change the device configuration such as image sensor, security level, capture, latent, relay, wiegand, and log option in master mode.



FDA12 & FIM10 **FIM01**

[Figure 32] System configuration window

In master mode, select **View->System Information**' menu. The sub window shown in [Figure 32] is displayed. After changing each parameter value, click each 'SET...' button to make changed parameter effective. You can see current parameter values with 'GET SYSTEM INFORMATION' or 'GET SYSINFO' button.

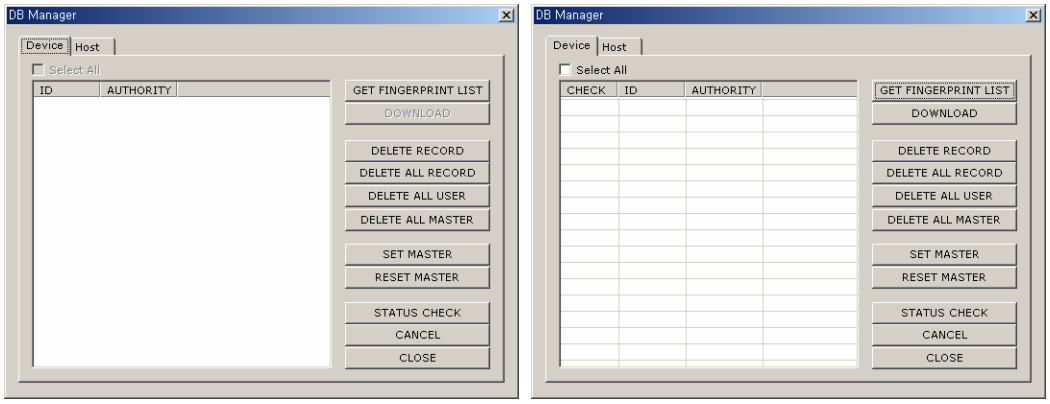
'SAVE SYSINFO' button is only included in system configuration window for FIM01. This button is used to save current system configuration of RAM in flash memory.

FIM01 need this function because of difference in option setup method. In FDA12 or FIM10, 'Set' functions make change parameter in not only RAM but also flash memory. But 'Set' functions make change parameter only in RAM in FIM01. Consequently, FIM01 is reset then changed information is disappeared. So, this button is needed.

* *System option is different according to devices (FDA12, FIM10-LV, FIM10-HV, FIM01 etc).*

3.2 Database Manager

The manipulation of DB is possible through DB Manager window in master mode.

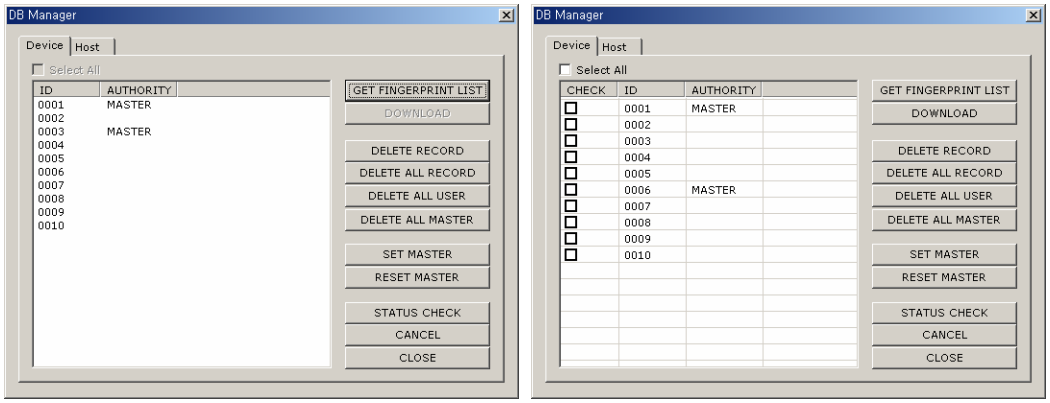


FDA12 & FIM10 **FIM01**

[Figure 33] Database Manager Window

3.2.1. 'GET FINGERPRINT LIST'

All enrolled user IDs and master IDs are displayed like [Figure 34]. The one column is user ID and the other column is authority field for a master indication. Normal user ID doesn't have any mark in authority field. By clicking 'GET FINGERPIRNT LIST', user lists are displayed.



FDA12 & FIM10 **FIM01**

[Figure 34] The DB manager window after getting fingerprint lists

3.2.2. 'DELETE RECORD'

In FDA12 or FIM10, a user can be deleted by clicking 'DELETE RECORD' button after selecting an ID to be deleted.

In FIM01, users can be deleted by clicking 'DELETE RECORD' button after checking check boxes of ID to be deleted.

3.2.3 'DELETE ALL RECORD'

All DB are deleted by clicking the 'DELETE ALL RECORD' button.

3.2.4. 'SET MASTER'

Normal user can be changed to master by clicking 'SET MASTER' button after selecting an ID to be master. In FDA12, only 5 master IDs are supported

3.2.5. 'RESET MASTER'

Master can be changed to normal user by clicking 'RESET MASTER' button after selecting an ID to be normal user.

3.2.6 'DELETE ALL USER'

All normal user are deleted by clicking 'DELETE ALL USER'

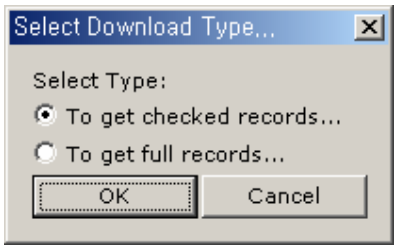
3.2.7 'DELETE ALL MASTER'

All master are deleted by clicking 'DELETE ALL MASTER'

3.2.8 'DOWNLOAD'

This function is used to get user record composed of registered user ID, password, encrypted fingerprint minutiae, privilege, and registered time from FIM01 and save it as a file.

If you want to get several user records of DB of FIM01, you check 'check box' of ID to be downloaded. And click the 'DOWNLOAD' button then window shown in [Figure 35] pops up.



[Figure 35] Window to select method for download

If you select 'To get checked records' and then click 'OK', you are able to get user records

checked and save it as a file.

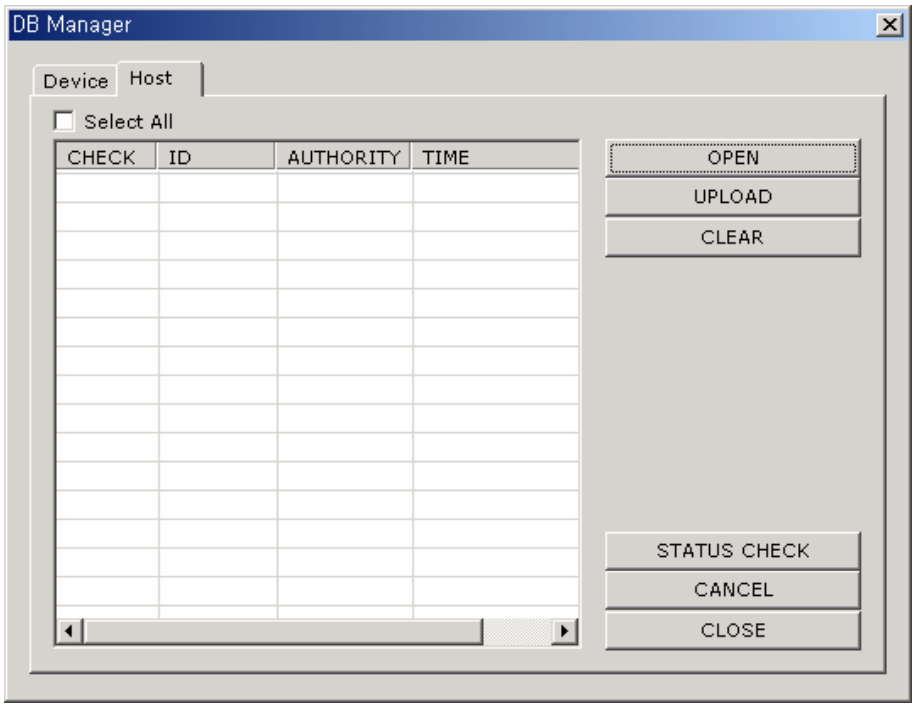
If you select 'To get full records' and then click 'OK' button in the window, all user records registered are downloaded as files. Each file name is same as user ID.

* *The structure of DB is described in "NITGEN_CommProtocol" document.*

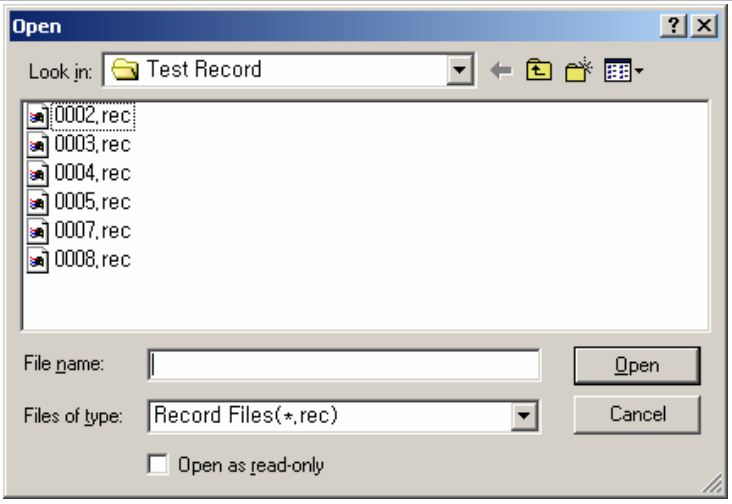
* *This function is only supported in FIM01*

3.2.9 'OPEN'

This function is used to update user records extracted through 'DOWNLOAD' function and display its information in EvTools™. Click the 'OPEN' button and then dialog window like [Figure 37] is displayed in host tab window of database manager as shown in [Figure 36].

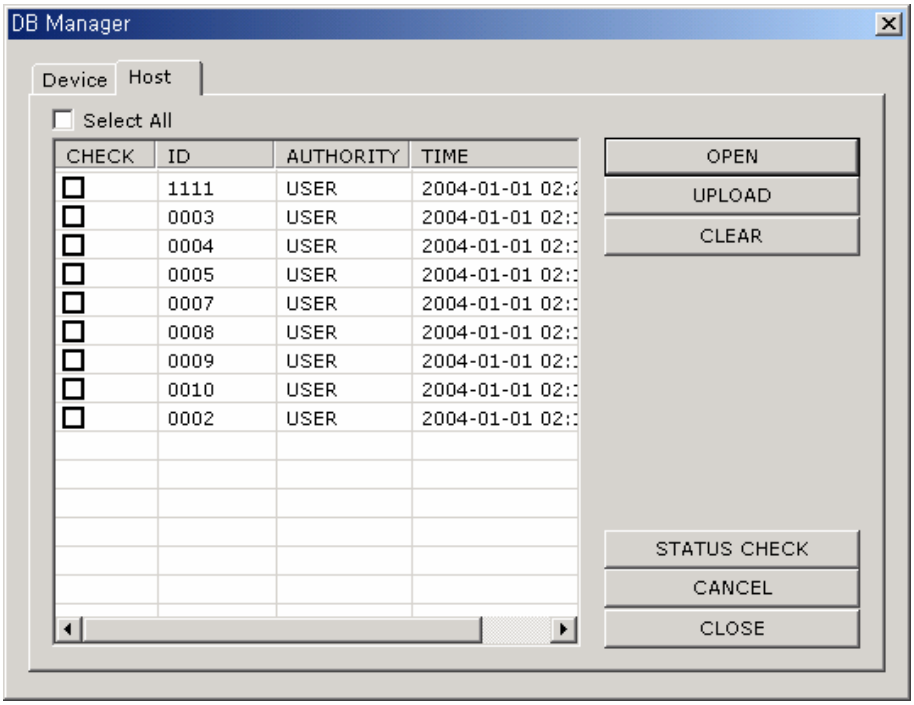


[Figure 36] Host tab window of database manager



[Figure 37] Dialog window for opening user record

Choose user record files you want to update, and user records are updated, and then the update information is displayed as shown in [Figure 38].



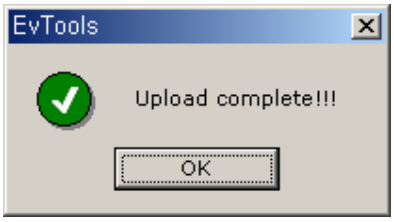
[Figure 38] Window after updating user data

** This function is only supported in FIM01*

3.2.10 'UPLOAD'

This function is used to add user records are updated in EvTools^{TM} to FIM01.

After checking check box of ID for uploading to FIM01, click this button, and then user records are added to FIM01 within affordable limit.



[Figure 39] Success message for uploading data

* *This function is only supported in FIM01*

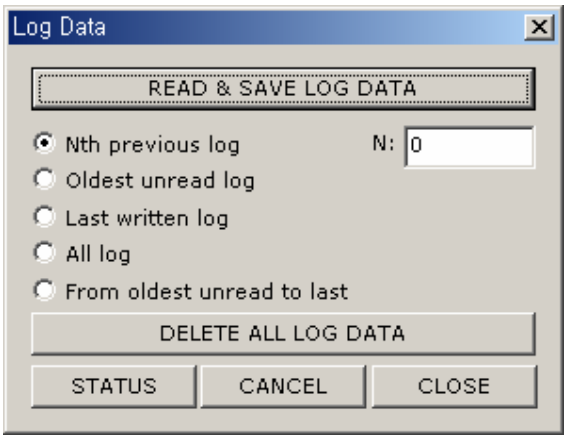
3.2.11 'CLEAR'

This function is used to delete data of user records updated in EvTools EvTools^{TM}. Click this button, then all data updated are deleted and list box of host tab is initialized.

* *This function is only supported in FIM01*

3.3 Saving Log Data

This paragraph explains how to save log date as a log file. Prior to saving log data, it should be master mode and 'Log Enable' of system configuration should be chosen.

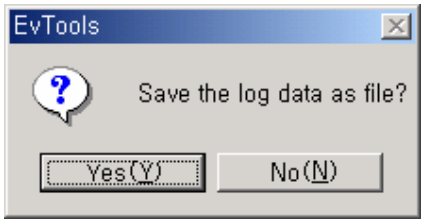


[Figure 40] The window to save log data

* *Log structure is different according to devices (FDA12, FIM10-LV, FIM10-HV, FIM01 etc).*

3.3.1 'READ & SAVE LOG DATA'

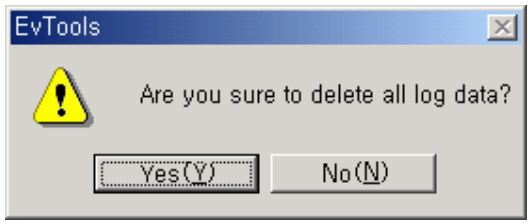
Firstly, select '**View->Log Data**' and then the log data window, [Figure 40], pops up. Click the 'READ & SAVE LOG DATA' button and then click 'OK' button in the window [Figure 41]. Input file name in the dialog window shown in [Figure 29].



[Figure 41] Message window to confirm saving log data

3.3.2 'DELETE ALL LOG DATA'

This function is used to delete all log data in FIM01. After clicking the 'DELETE ALL LOG DATA' button, Click 'OK' button in the message window shown in [Figure 42].

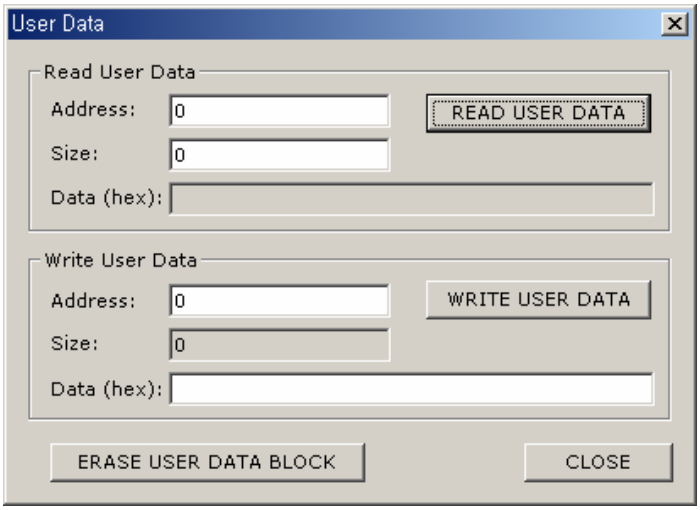


[Figure 42] Message window to confirm deleting all log data

* *This function is only supported in FIM01*

3.4 User Data

FDA12, FIM10, and FIM01 have pre-allocated non-volatile memory for user application specific purpose. It is possible to write/read application specific data at this memory. It's so called user data. You can write one byte by one byte and read several bytes at one time.



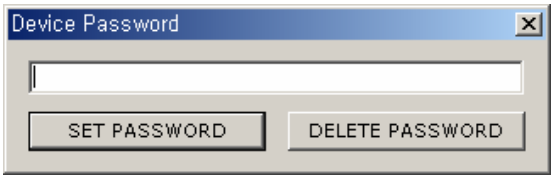
[Figure 43] User data window

* *User data size is different according to devices (FDA12, FIM10-LV, FIM10-HV, FIM01 etc).*

3.5 Device Password

The device (FDA12 / FIM10 / FIM01) supports device password that can be used for master authentication without master FP or password. Device password should be created only in master mode.

To create a device password, select '**Tools->Device Password**' and then the related window, [Figure 44] pops up.

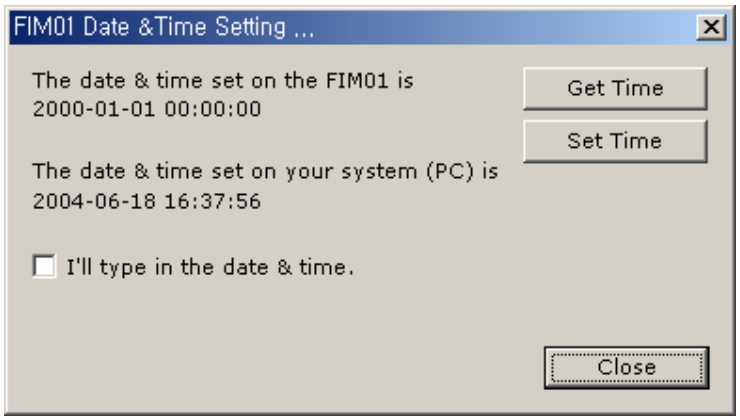


[Figure 44] Device password window

Type the new password up to 15 digits and then click 'SET PASSWORD' button to complete creation. On the other hand, if you want to delete a master password, click the 'DELETE PASSWORD' button.

3.6 Set Time

This function is used to read date and time from FIM01 or write date and time to FIM01. After setting RTC in power-on, RTC value can be increased.

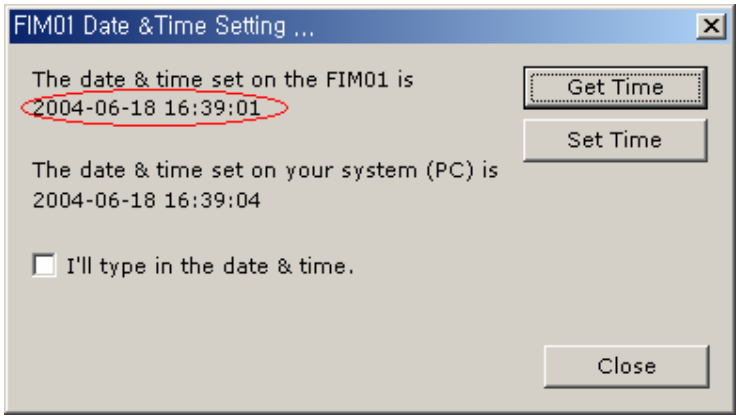

FIM01 Date &Time Setting ...
The date & time set on the FIM01 is
2000-01-01 00:00:00
Get Time
Set Time
The date & time set on your system (PC) is
2004-06-18 16:37:56
I'll type in the date & time.
Close

[Figure 45] Initial window for date and time

* *This function is only supported in FIM01*

3.6.1 'Get Time'

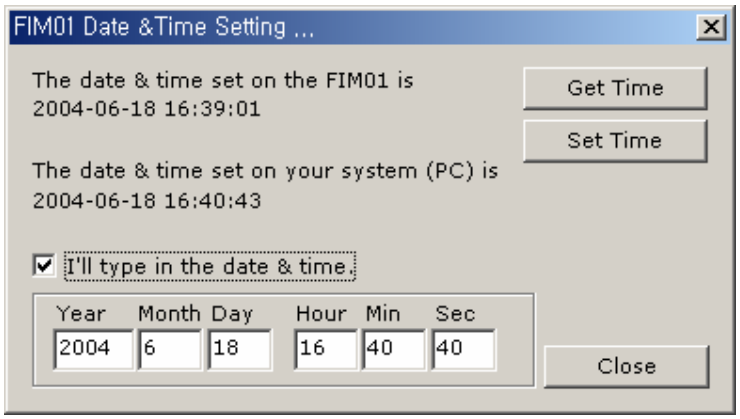
This is used to read date and time from FIM01. After click this button, date and time set up in FIM01 displayed as shown in [Figure 46].


FIM01 Date &Time Setting ...
The date & time set on the FIM01 is
2004-06-18 16:39:01
Get Time
Set Time
The date & time set on your system (PC) is
2004-06-18 16:39:04
I'll type in the date & time.
Close

[Figure 46] Window after clicking 'Get Time'

3.6.2 'Set Time'

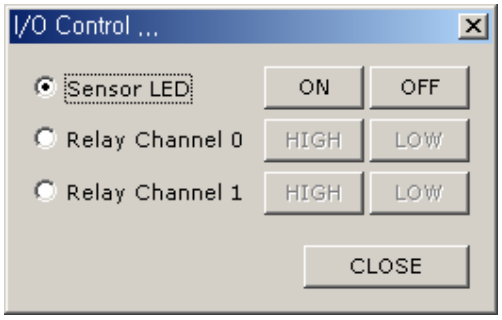
Two procedures are used for set up date and time in FIM01. One is to use date and time set up in PC installed EvTools™. Only click the 'Set Time' button without check 'I'll type in the date & time'. The other procedure is to input date and time directly. Check 'I'll type in the date & time', and then edit box is displayed as shown in [Figure 47]. After typing date and time for set up in FIM01, click the 'Set Time' button.


FIM01 Date &Time Setting ...
The date & time set on the FIM01 is
2004-06-18 16:39:01
Get Time
Set Time
The date & time set on your system (PC) is
2004-06-18 16:40:43
I'll type in the date & time.
Year Month Day Hour Min Sec
2004 6 18 16 40 40
Close

[Figure 47] Widow for inputting date and time

3.7 I/O Control

This function is used to turn on/off sensor LED of FIM01 or control relay port. Select the menu '**Tools->I/O Control**', and then control window, [Figure 48], pops up. After selecting control item (Sensor LED or Relay), proceed test wanted.



[Figure 48] I/O control window

* *This function is only supported in FIM01*

3.8 Check Low Voltage

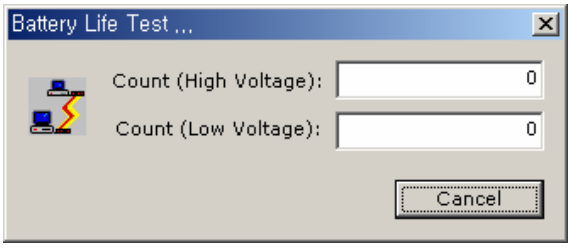
This function is used to check if power level is under low voltage level (DC2.1V) or not. Select the menu '**Tools->Check Low Voltage**'. When power is insufficient, change batteries.

[Figure 49] Message window indicating sufficient power

* *This function is only supported in FDA12*

3.9 Battery Life Test

This function is used to check how many times recognition process can be done under battery operation. Supply power to FDA12 with battery and then select '**Tools->Q/A Test->Battery Life Test**'. The battery life test window, [Figure 50], pops up and then test starts automatically



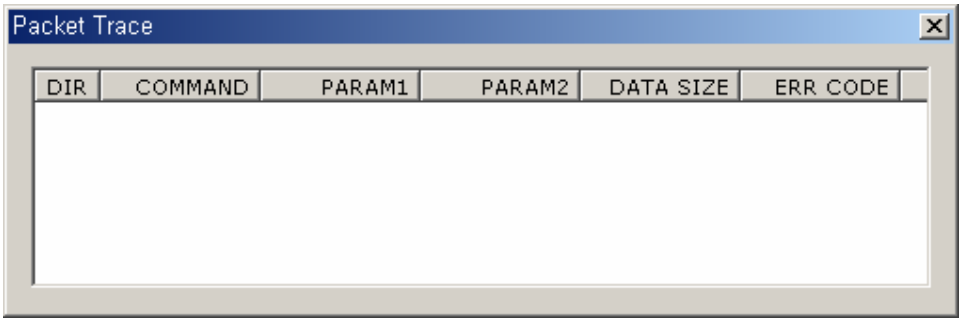
[Figure 50] The window of battery life test

'Count (High Voltage)' indicates iteration number of recognition until battery is 'Low voltage' and 'Count (Low Voltage)' indicates iteration number after battery is 'Low voltage'. Sum of two counts becomes usable total count.

* *This function is only supported in FDA12*

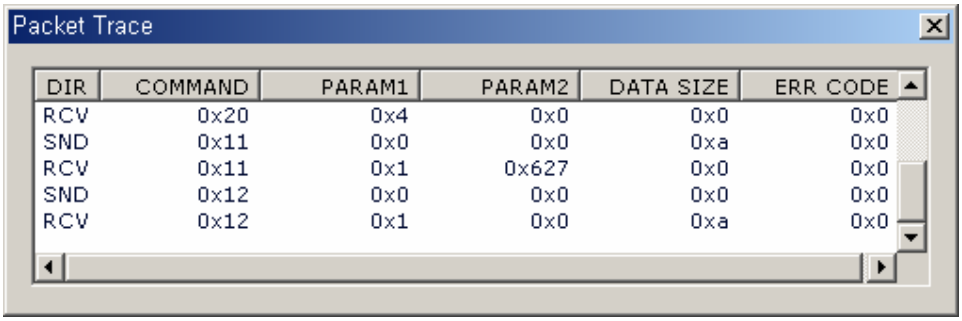
3.10 Packet Trace

This function is used to observe transmitted packets between device (FDA12 / FIM10 / FIM01) and EvTools™. Select '**View->Packet Trace**' and then packet trace window, [Figure 51], shows up.



[Figure 51] Initial packet trace window

The packet trace window displays received/transmitted packets according to every command and acknowledge.


Packet Trace
DIR COMMAND PARAM1 PARAM2 DATA SIZE ERR CODE
RCV 0x20 0x4 0x0 0x0 0x0
SND 0x11 0x0 0x0 0xa 0x0
RCV 0x11 0x1 0x627 0x0 0x0
SND 0x12 0x0 0x0 0x0 0x0
RCV 0x12 0x1 0x0 0xa 0x0

[Figure 52] Packet trace window to display packets

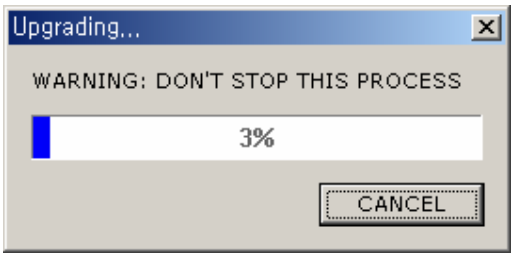
3.11 Power On/Off

By using a power down function, FDA12 can be powered off. Click the 'Power Off' button and then EvTools™ powers off FDA12 via RTS signal line of RS232.
The appearance of this button is changed according to power status of FDA12. When FDA12 is powered on, the appearance of the button is 'Power Off'. When powered off, the appearance of the button is changed to 'Power On'.

* *This function is only supported in FDA12*

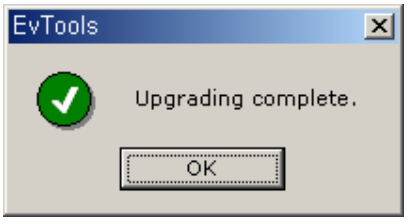
3.12 Upgrade Firmware

Programs stored in the flash memory of device can be quickly and easily upgraded using this function. From windows menu bar, select '**Tools->Upgrade Firmware**', and then dialog window for opening firmware file pops up. Select a firmware file for upgrade, and then the upgrade is proceeding with processing bar window [Figure 53]. Firmware file format of FDA12 is Intel hex (*.hex), and firmware file format of FIM10 and FIM01 is binary (*.bin).



[Figure 53] Processing bar window

When firmware upgrading completes, success message window, [Figure 54], pops up.



[Figure 54] Success message window for upgrading firmware

Appendix A. Serial Communication Set Up in FIM01

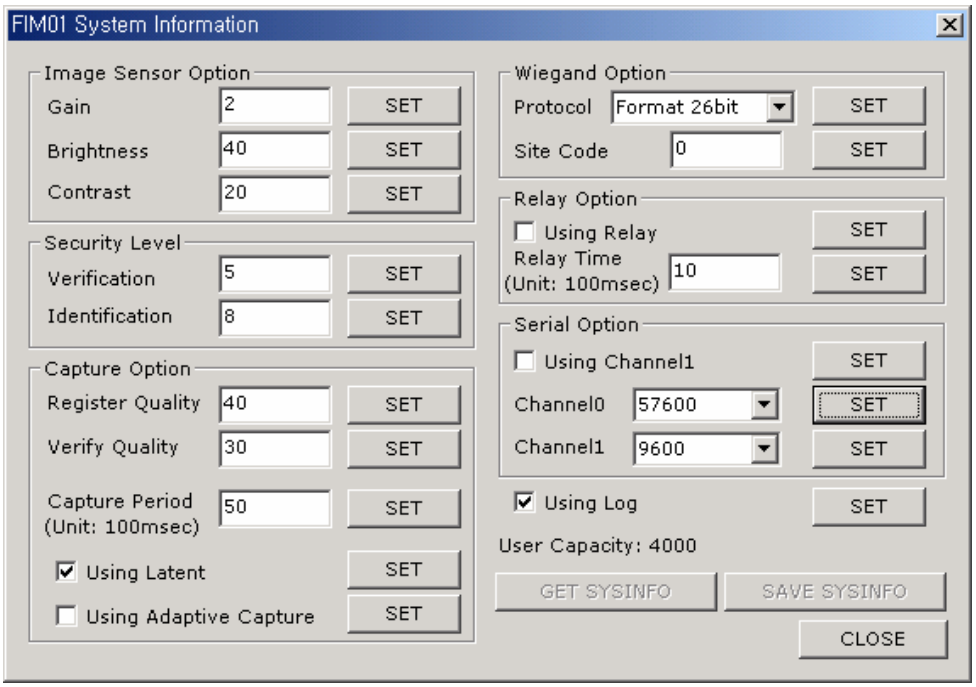
In this chapter, how to change baud rate of FIM01 and EvTools™ is explained.

1. The Change of Baud-rate of FIM01

In master mode, select '**View->System Information**' menu to display 'system configuration window'. Then change baud rate of channel you want to the new value and click '**SET**' button. If all procedures are successfully done, the message window shown in [Figure 55] is displayed.

[Figure 55] Success message window for changing baud rate of FIM01

'GET SYSINFO' and 'SAVE SYSINFO' button are inactivated.



[Figure 56] System configuration window after changing baud rate of FIM01

In this status, only the baud rate of FIM01 is changed. So, serial communication is impossible

between FIM01 and EvTools™. Close system configuration window.

2. The Change of Baud-rate of EvTools™

Select **'File->Serial Comm'** to display the serial communication configuration window, then change baud rate as the same as it of FIM01.

3. Reconnection

If the baud rate of EvTools™ is changed successfully, try to connect again by clicking the 'CONNECT' button in main window. If the baud rate of EvTools™ and FIM01 is different, EvTools™ try to connect FIM01 by changing it automatically.

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